Geo372
Vertiefung GIScience

People, participation and GIS

Herbstsemester

Flurina Wartmann

Learning objectives

- You are able to describe what a **participatory GIS (PGIS)** and a **Public Participation GIS (PPGIS)**
- You can give **examples** of **PGIS/PPGIS approaches** and link them to the **ladder of participation**
- You are able to **discuss** potential **challenges** of PGIS/PPGIS approaches and can suggest **good practices**
- You know the **role of geographic categories** for representations on maps and in GIS, and can **discuss implications** of categorisations

Outline

- You are going to see examples of **public participation GIS** and **participatory GIS** approaches, and learn about **limitations** of such approaches
- You are going to hear about ways in which we can explore how **people think and communicate** about their environment and use this as a basis for representations on maps and in GIS
- You are going to work on a small exercise to think about **opportunities** and **issues** related to **participation** in the production and use of GIS

Participation matters

Parc Adula project is an example of an initiative where the public is taking an active role in decision-making

http://www.srf.ch/play/tv/news-clip/video/das-projekt-parc-adula?id=488abb0c-5cc4-4ef8-b72d-a22414816f39

Decision-making by the public

Der Parc Adula stirbt nach 16 Jahren den Tod an der Urne

Die Schweiz erhält keinen neuen Nationalpark. Die betroffenen Bündner und Tessiner Gemeinden sagen nein.

www.tagesanzeiger.chschweiz/swissleaks/der-parc-adula-stirbt-nach-16-jahren-den-tod-an-der-urne/story/17099387

Abstimmung Parc Adula

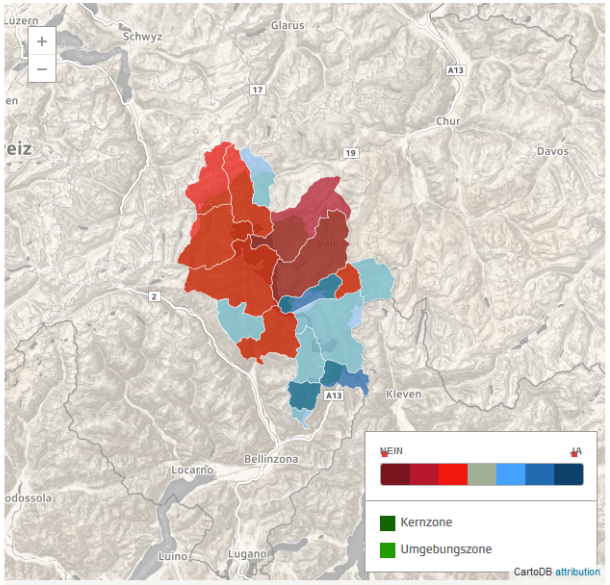
Nationalpark-Projekt ist am Ende

von Peter Jankovsky, Bellinzona / 27.11.2016, 14:17 Uhr

Damit der geplante Nationalpark im Grenzgebiet der Kantone Graubünden und Tessin zustande kommt, müssen mindestens 13 der 17 betreffenden Gemeinden dafür sein – doch acht sagen Nein.

http://www.nzz.ch/schweiz/abstimmungen/abstimmung-parc-adula-nationalpark-projekt-ist-am-ende-ld.130941

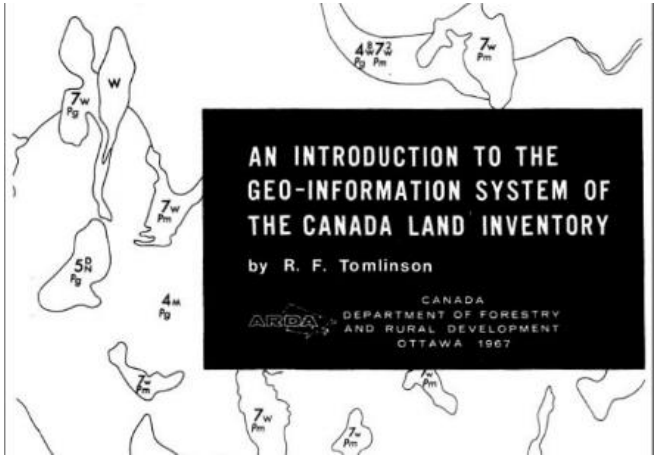
Einen zweiten Nationalpark wird es in der Schweiz vorerst nicht geben. 8 von 17 Tessiner und Bündner Gemeinden sprachen sich gegen das Projekt Parc Adula aus – höchstens 4 hätten es sein dürfen.



www.srf.ch/news

A little history

- In 1968 Roger Tomlinson uses the term “GIS” to designate the Canadian geographic information system
- The system was developed for storing and analysing data about land usage in Canada



“Data for decision:” https://www.youtube.com/watch?v=eAFG6aQTwPk

The origins of GIS

- As **governmental sectors** of land use and resource planning, census bureaus and the military started realising the advantages of GIS, **commercial software** development started
- Technology was **expensive** and **experts** were needed to operate the systems, excluding the major part of the population
- As technology became cheaper and GIS more widespread, there were demands to **open up GIS to the public** and make them **more inclusive**

Public participation GIS (PPGIS)

- **PPGIS** refers to the **use of GIS technology** to **support** and **empower public participation** in areas such as planning, natural resource management and policy development (Sieber 2006)
- Mostly in developed countries and urban contexts in the global North
- The **goals** of **PPGIS** are to:
  - empower less privileged groups in society
  - influence policy-making
  - support various stages of a more collaborative planning process

Example: PPGIS for neighbourhood planning

- Case study by Elwood (2002) on developing a PPGIS for neighbourhood improvement in Minneapolis

- Neighborhood association: provide better information for allocating funds to repair houses

Table 6.1 Data attributes of PPNA housing database

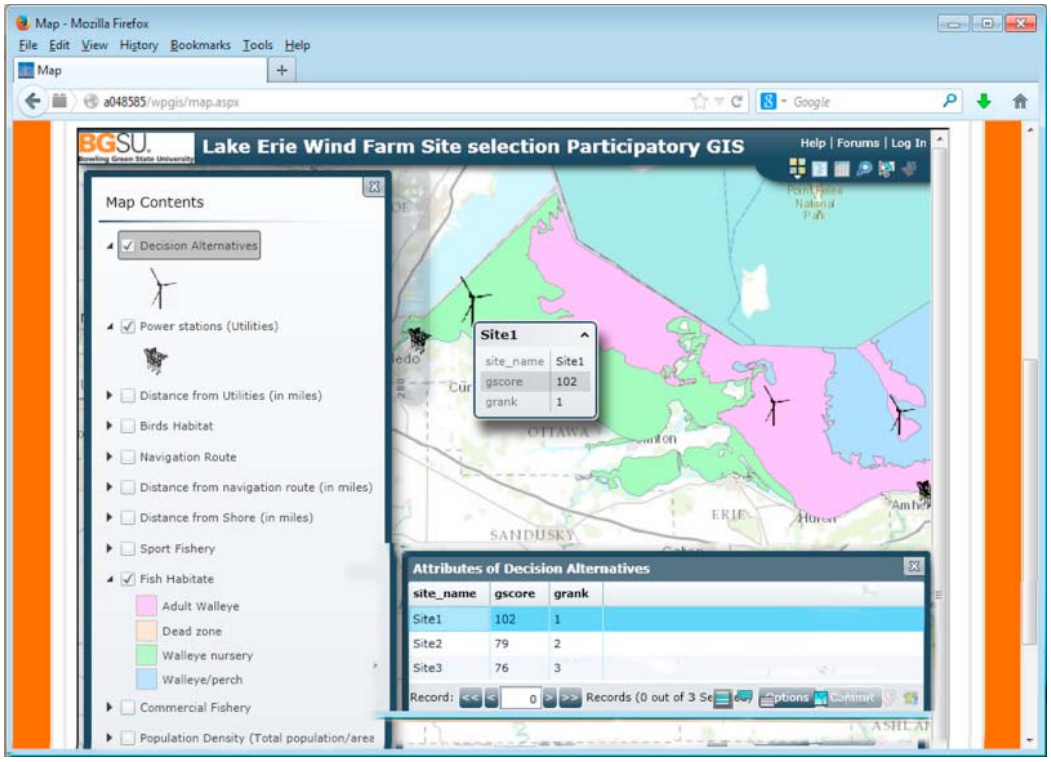
Property	*Involved individuals*	*Activities/Problems*
Lot size*	*Owner/Taxpayer* • Name* • Address* • Phone number* • PPNA involvement • Volunteer skills	Past problems PPNA actions Staff/Resident observations
Zoning*	*Rental License Holder** • Name* • Address* • Phone number* • PPNA involvement • Volunteer skills	
Property ID number*	*Caretaker/Manager* • Name • Address • Phone number • PPNA involvement • Volunteer skills	
Age of structure*	*Block Leader* • Name • Address • Phone number • PPNA involvement • Volunteer skills	
Condition code*	*Tenants* • Name • Address • Phone number • PPNA involvement • Volunteer skills	
Legal description*		
Tenure status*		
Tax delinquent status*		
Sales history		

*: already included in the governmental database

Example: PPGIS for wind farm suitability analysis

- Case study on windfarm locations at Lake Erie (USA)

- Goal: to help with complex problem-solving, decision-making and building consensus



Mekonnen & Gorsevski (2015)

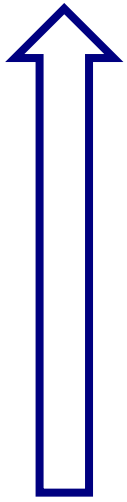
People in PPGIS

- Increasing the **range of stakeholders** and parts of the population typically not reached

- Including **other data sources**, not only official governmental records and maps

- Providing opportunities for people to participate in decision-making (this links to the lecture on **spatial decision-making support**)

The ladder of participation



Public participation ladder (Wiedemann & Femers 1993)
Public partnership in the final decision
Public participation in assessing risk and recommending solutions
Public participation in defining interests and determining the agenda
Public right to object
Informing the public
Public right to know

http://geog.sdsu.edu/People/Pages/jankowski/public_html/web780/Wiedemann_Femers_1993.pdf

Another typology by Sherry R Arnstein is the **Ladder of Citizen Participation**

http://lithgow-schmidt.dk/sherry-arnstein/ladder-of-citizen-participation.html

To participate or not to participate

Anonymous.

French student poster

Challenges of PPGIS

- **People**
  - How are participants selected? Who is not included?
  - What are barriers to participation?
- **Context**
  - For what cultural/social/political contexts were GIS developed? And are these contexts comparable?
- **Technology and data**
  - What is the accuracy, relevance and quality of the data collected?
  - How does the technology constrain what type of information can be collected? What knowledge is not included?

Critiques of exporting GIS to other cultural settings

- Certain **assumptions** are inherent in the **data models** and **representations** used in current GIS

- Some scholars have argued that GIS are:

  "*toxic to human diversity, notably the diversity of systems for knowing about the world*"
  (Rundstrom 1995: p. 45)

Participatory GIS (PGIS)

- PGIS, often also known as **community-based mapping** evolved from Participatory Rural Appraisal (PRA)
- PRA is a methodology used in **development cooperation** to define goals of development projects together with local communities (Chambers 1994)
- PGIS combines tools of cartography and GIS with **participatory methods** to document the **spatial knowledge** of **local communities**

Why PGIS?

- Participatory maps and PGIS often represent a **social and cultural understanding** of landscape
- The **process** of **community involvment** in the production of the map is just as (or even more) important than the final product
- Participatory maps can include information that is typically not represented on official maps and provide **alternative views,** often from **marginalized groups** of society on dominant perspectives

Example: PGIS for mapping indigenous land rights

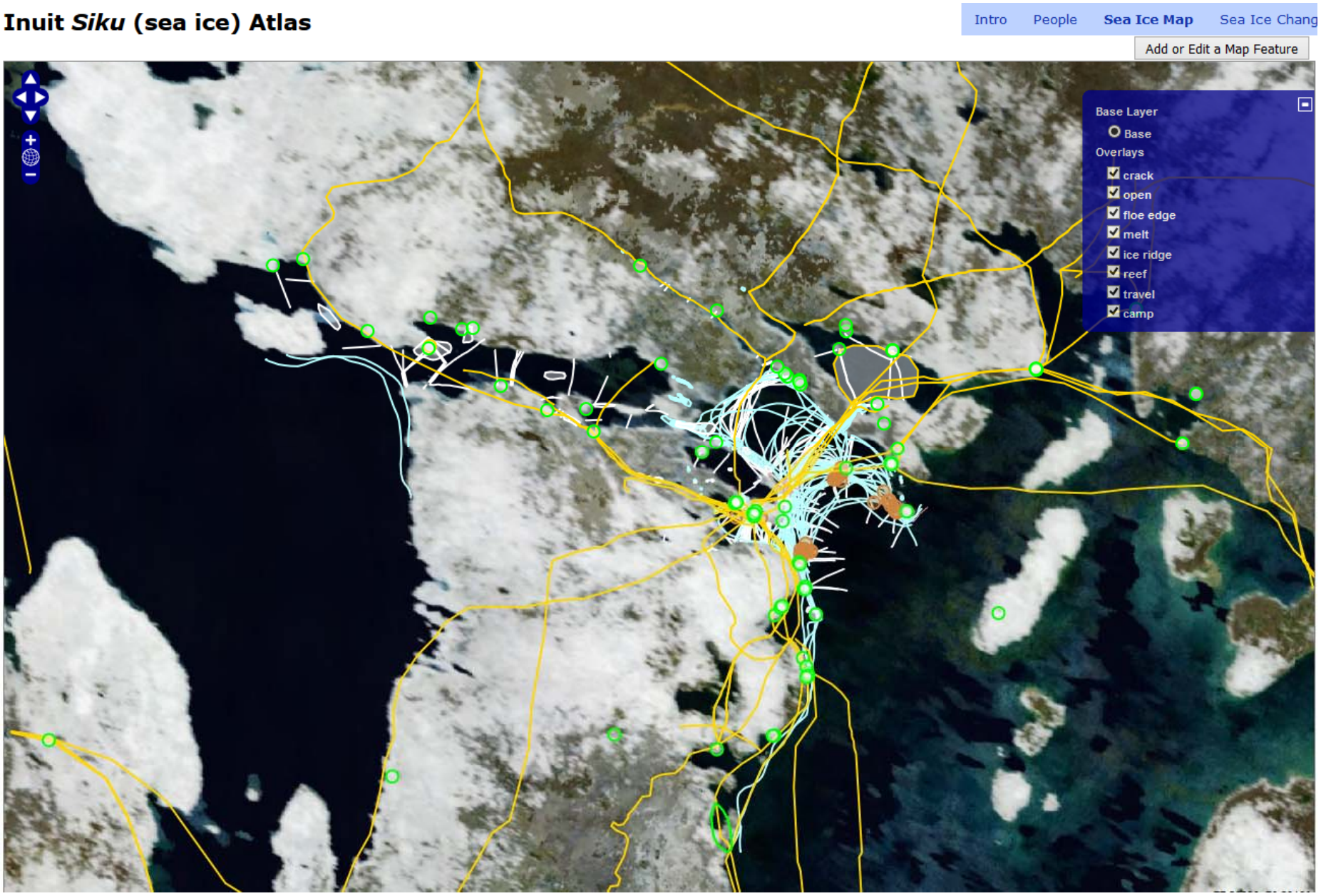
- The NGO ‘Rainforest Foundation UK’ conducts mapping projects on land rights of Baka indigenous people in the Congo basin www.mappingforrights.org
- Goal: documenting indigenous land tenure and uses of forest resources to inform natural resource management

https://www.youtube.com/watch?v=qRhYktaBWYg

Example: PGIS for documenting indigenous uses of sea ice

- Inuit Sea Ice Use and Occupancy Project in Canada (Aporta 2011)
- Goal: to map indigenous knowledge and uses of sea ice with GIS
- Increase scientific knowledge about impacts of climate change
- Document the traditional environmental knowledge of Inuit elders for young Inuit

http://sikuatlas.ca



http://sikuatlas.ca/sea_ice_map.html?module=2

How to document local knowledge?

- Using a range of ethnographic and GIS methods, including:
  - Participatory observation
  - Interview
  - Focus group discussion
  - Sketch mapping (using sticks in soil, pen and paper)
  - Adding local knowledge to offical maps from hand or in a GIS
  - Mapping local usage and knowledge with GPS to display in GIS software
  - ...


THARAKA
CIAMURIA
MUTUNDA
MUURO WA
MUURO WA KIATHITA
MUURO WA THANANTU
RUAU
NDIAIRI
IRJ
MANYIRANI
IRJ
URORYA
IRJ
KIBURUU KIA

F. Wartmann

www.landscapes.org


POND INLET
Baffin Island
BIG MAMMALS
caribou
polar bear
walrus
ringed seal
bearded seal
narwhal
beluga whale
SMALL GAME AND BIRDS
arctic hare
geese
ducks
ptarmigan
other bird
bird eggs
FISH
arctic char
FURBEARERS
arctic fox (trapped)
arctic fox (trapped)
wolf (shot)
PLANTS AND EARTH MATERIALS
berries
food plant
fuel plant
soapstone

Tobias (2009)

Examples of pitfalls (or what can go wrong)

- PGIS are not a solution for all problems related to land rights and resource use of marginalised groups
- PGIS can have **unintended** negative **consequences**:
  - delimiting **boundaries** for nomadic pastoralist Masaai community in Tanzania (Hodgson and Schroder 2002)
  - **documenting** hunting practices of indigenous people that are considered **illegal**

http://hraf.yale.edu/

Good practice for PGIS

Based on Rambaldi et al. 2006:

- Openness and honesty
  - explain the process clearly and in local languages
  - be honest about the strenghts as well as the limits to influence outcomes
- Obtain informed consent
  - participation must be voluntary
  - people must be able to withdraw at any time
- Sensitive information
  - Avoid exposing people to danger

http://www.eldis.org/vfile/upload/1/document/0803/ID24053.pdf

Good practice for PGIS (continued)

- Boundaries
  - Boundaries can be seasonal, fuzzy, overlapping
  - Avoid outlining boundaries except if it is the specific purpose of the project
  - Representing crisp and fixed boundaries on a map can ignite previously non-existing conflicts
- Technical solutions
  - Consider using approaches that are adapted to local needs and capacities
- Recognise intellectual ownership
  - Ensure that multiple, full quality copies of maps and digital data sets remain with those who shared their spatial knowledge

Is that enough?
Towards more people-centred GIS

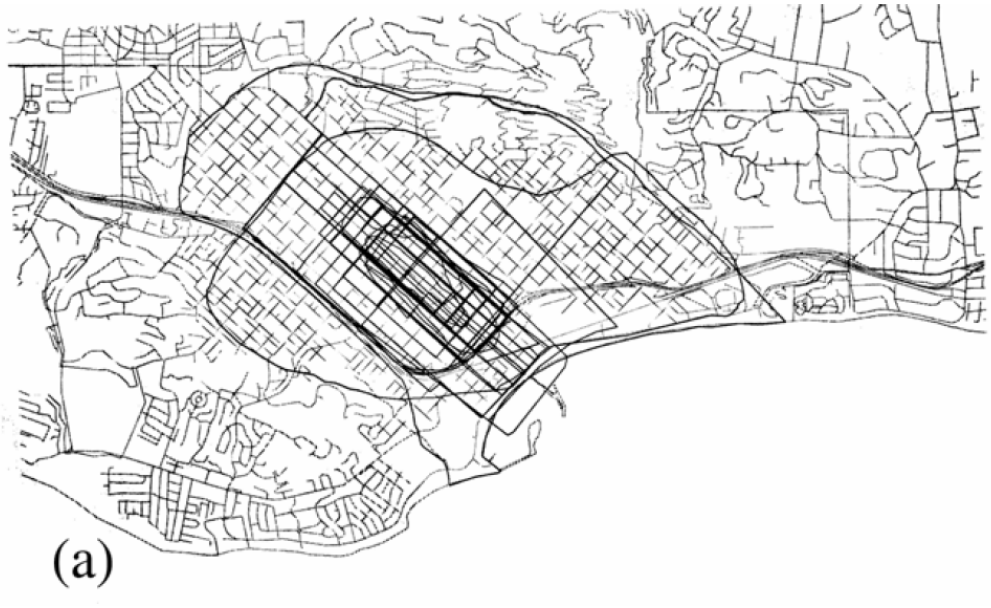
GIS interfaces in the 1990s often used for PGIS/PPGIS required users to learn their language, rather than adopting to the intuitive language of people (Craig, Harris & Weiner 2002, p. xxi):

"We humans work every day with geographic information, as we share driving directions, describe distant places to each other, or reason about the information we acquire through our senses. […].

If the conceptual structures of GIS were similar, it was argued, then GIS would be necessarily easier to use, and accessible to a much larger proportion of the general public […]."

How do people perceive the world?

- **Language** is a fundamental means how we communicate **spatial information**
- **Categories** in language are often vague, fuzzy and probabilistic, such as *downtown*, or *near* (Montello et al. 2003)



Definition of a category

'A category exists whenever two or more distinguishable objects or events are treated equivalently'

(Mervis & Rosch 1981, p. 89)

chair

chair

Thought exercise

- What examples of geographic categories do you know?

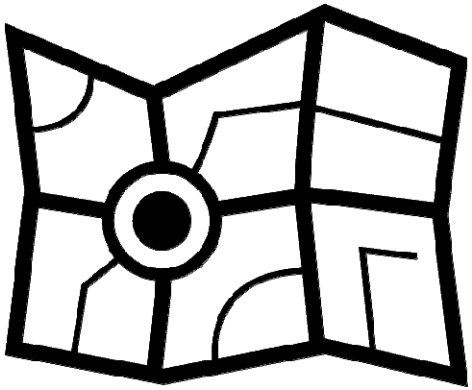
→**On a piece of paper, write down all geographic categories you can think of.**

Time: 1 minute

Relevance of geographic categories

- Geographic categories are fundamental for abstracting reality for computational representations (Schuurman 2006)

categorisation



‘perceived reality’

representations on maps and in GIS

Geographic categories

Vegetation		Gewässer		Gelände	
Wald, geschlossener Rand	Wald, lockerer Rand	Quelle	Bach	Senke	Doline
Offener Wald	Einzelbaum / Baumgruppe	Wasserfall		Erdböschung	Steinböschung
Gebüsch	Hecke	Trockenrinne	Bachverbauung	Einschnitt	Damm
Obstgarten	Baumschule	Fluss, Altwasser	Flussverbauungen, Wehr	Erdschlipf	Kiesgrube
Reben		Sumpf	Torfland	Lehmgrube	Steinbruch
		See, Ufer	Unbestimmtes Ufer	Fels	Geröll
		Hafen, Ufermauer	Autofähre	Gletscher	Moräne

Short discussion

- Form groups of 3-4 with your neighbors.
- Compare your lists in the group:
  - Can you find one or more categories that everyone (or at least two people) in the group share?
- Now compare your lists with the ‘Zeichenerklärung’ from swisstopo:
  - Are these shared categories included in the ‘Zeichenerklärung’?
  - Can you find other examples of categories from your own list that are **not included** in the swisstopo ‘Zeichenerklärung’?

Divergent perspectives on categories

- Physical geography: assumption that categories are objective, value-neutral, apolitical, and universal

- Critical views: categories and their representations on maps and in GIS are socially constructed and imbued with power (Pickles 1995)

- GIS and cognitive psychology: Geographic categories result from human deliberation (Smith and Mark 2003)

nature.org

highcountryposts.com

Kuhn (2012), vespucci.org

Landscape categorisation varies *between* cultures and languages

Landscape categories do not neatly match between languages and cultures and are sometimes **intranslatable** (Johnson 2011, Mark and Turk 2003):

English	Manyiljarra
hill / mound ≠	yapu / tamu

Claire Hill 2016

- ***ts'iliks**:* Gitskan for where water barely covers a rock but there is no wave (Johnson 2011)

- ***caochan***: Gaelic for a slender moor stream obscured by vegetation that it is virtually hidden from sight (Macfarlane 2015)

Landscape categories have different definitions and meanings

- Even **within a language**, the same category can be **understood differently**, e.g. *forest*:

> *'[...] while in Britain, according to Forest Enterprises a 'forest' might not even have any trees on it, and, in both Scandinavia and Eire, land covered in slow-growing trees might not be forest at all'*
>
> (Comber et al. 2005, p.200)

forest

forest

~~***forest***~~

Landscape categories influence management

- Different categorisations result in different management approaches:
  - Ministry of Forestry in Rajasthan categorised land as ***degraded wasteland*** in need of reforestation
  - local people categorised it as ***gocher*** (important communal grazing areas) (Robbins 2003)

secali.se

graze cattle?

plant exotic trees?

Local landscape categories

- 157 landscape categories in the local Spanish dialect

Categories for…	Number of folk landscape categories
… vegetation features	60
… agricultural features	30
… water features	28
… topographic features	25
… substrates	13
… animal habitats	1

Wartmann & Purves (in press)

Example of local vegetation category

Local vegetation category	English gloss	Scientific classification	Scientific name of indicator plant
jatatal	area of *jatata* palms	***Well-drained Amazonian forest*** (with *Geonoma deversa*)	*Geonoma deversa*

Example of local agricultural category

barbecho nuevo

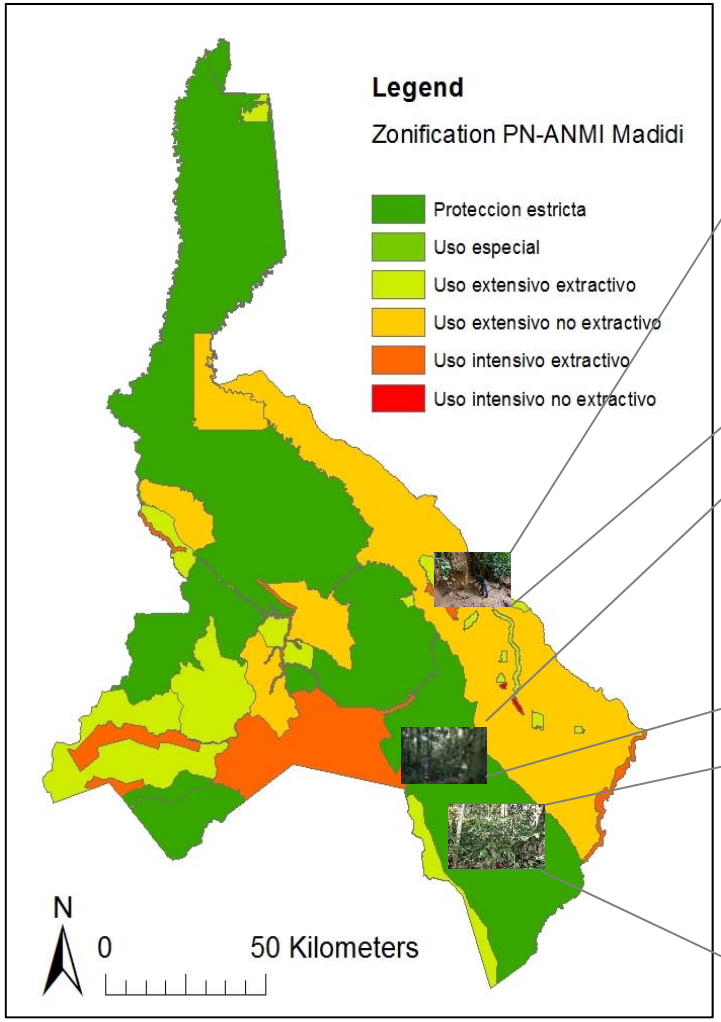
barbecho viejo

Local agricultural category	English gloss	Scientific classification
barbecho nuevo	new fallow field	***Secondary Amazonian forest***
barbecho viejo	old fallow field	***Secondary Amazonian forest? / Amazonian forest with humid soils***

Example of local topographic category

Local category	English gloss	Cultural significance
salitral	mineral salt lick	sacred places where spirits dwell, important hunting sites

Where are local categories in the GIS?

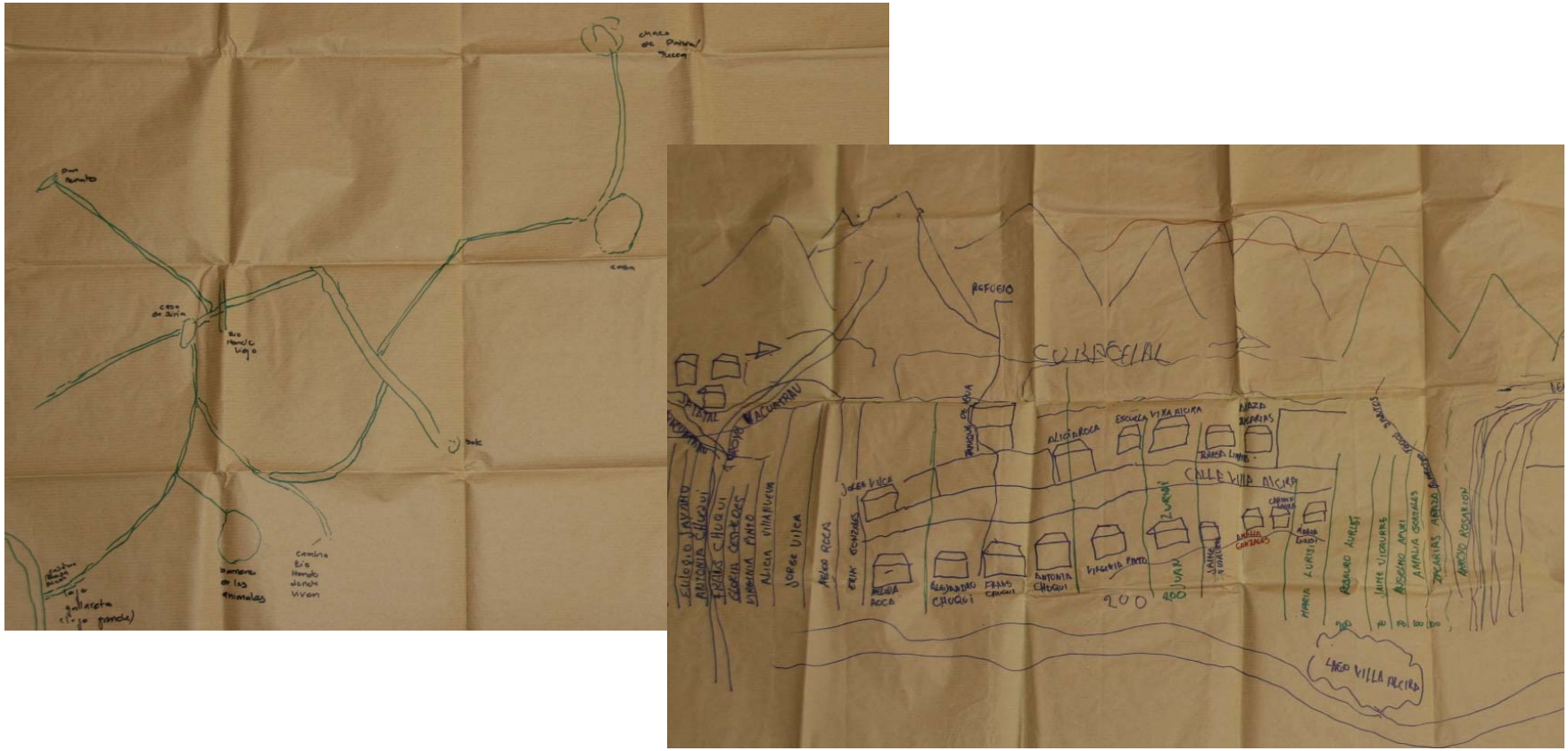


salitral
sacred area
vs. intensive use

barbecho
fallow plot for future use,
informal land tenure
vs. strict proteccion

jatatal
high economic
importance
vs. strict proteccion

Are these categories on participatory maps?



Need to integrate linguistic, cognitive and human geography approaches to document local knowledge on maps and in GIS

Summary

- We have seen **examples of PPGIS and PGIS** (and some of the differences between these approaches)
- You have learned about **potential challenges,** things that can go (and have gone) wrong
- You have heard some suggestions for **good practices** when working with communities
- You have been introduced to the importance of **geographic categories** for abstracting and representing reality on maps and in (participatory) GIS
- You have seen examples of the implications of **geographic categorisation**

Exercise

The project “Parc Adula” (www.parcadula.ch) aimed at creating a new national park in Switzerland, with the full participation of local communities. Now some of the communities want to create their own protected area in the form of a “Naturpark”. Imagine that you were part of the project team and your task was to present an outline for a participatory GIS project:

- Define the goal of your participatory GIS project
- Which stakeholders would you involve?
- Define a participatory method you would use and the types of data to be collected
- At which level in the ladder of participation is your project situated?
- List 2 potential challenges and how to address them

Next week

- You will **discuss** the **exercise** from last week's lecture
- look at geographic information produced by users in the form of **volunteered geographic information** and **crowd-sourcing**
- You will learn about how such **user-generated content** can be used for answering **questions** related to **GIScience**
- You will get to know about **methods and applications** with user-generated content, as well as some of the **challenges and limitations**

References

- Aporta, C. (2011). Shifting perspectives on shifting ice: documenting and representing Inuit use of the sea ice. *Canadian Geographer*, 55(1), 6–19.
- Chambers, R. (1994). The Origins and Practice of Participatory Rural Appraisal. *World Development*, 22 (7), 953–969.
- Comber, A. J., Fisher, P. F., & Wadsworth, R. A. (2005). What is land cover? *Environment and Planning B: Planning and Design*, 32(2), 199–209.
- Hodgson, D. L., & Schroeder, R. A. (2002). Dilemmas of Counter-Mapping Community Resources in Tanzania. *Development and Change*, 33(1), 79–100.
- Johnson, L. M. (2011). Language, landscape and ethnoecology, reflections from northwestern Canada. In D. M. Mark, A. G. Turk, N. Burenhult, & D. Stea (Eds.), *Landscape in language. Transdisciplinary perspectives* (pp. 291–326). Amsterdam / Philadelphia: John Benjamins Publishing.
- Macfarlane, R. (2015). *Landmarks*. London: Penguin Books.

References

- Mervis, C. B., & Rosch, E. (1981). Categorization of natural objects. *Annual Review of Psychology*, 32(1), 89–115.
- Montello, D. R., et al. (2003). Where's Downtown?: Behavioral Methods for Determining Referents of Vague Spatial Queries. *Spatial Cognition & Computation*, 3(2–3), 185–204.
- Pickles, J. (1995). *Ground truth*. (J. Pickles, Ed.) *The social implications of geographic information systems*. New York: Guilford Press.
- Robbins, P. (2003). Beyond ground truth: GIS and the environmental knowledge of herders, professional foresters, and other traditional communities. *Human Ecology*, 31(2), 233–253.
- Rundstrom, R. A. (1995). GIS, Indigenous Peoples, and Epistemological Diversity. *Cartography and Geographic Information Systems*, 22(1), 45–57.
- Schuurman, N. (2000). Trouble in the heartland: GIS and its critics in the 1990s. *Progress in Human Geography* 24 (4): 569–590.

References

- Schuurman, N. (2006). Formalization matters: Critical GIS and ontology research. *Annals of the Association of American Geographers*, 96(4), 726–739.
- Sieber, R. E. (2006). Public participation geographic information systems: A literature review and framework. *Annals of the Association of American Geographers* 96(3): 491-507.
- Smith, B., & Mark, D. M. (2003). Do mountains exist? Towards an ontology of landforms. *Environment and Planning B: Planning and Design*, *30*, 411–427.
- Wartmann, F. M., & Purves, R. S. (in press). “This is not the jungle, this is my barbecho”: semantics of ethnoecological landscape categories in the Bolivian Amazon. *Landscape Research*.
- Weiner, D., Harris, T. M., & Craig, W. J. (2002). *Community participation and geographic information systems*. London; Taylor & Francis.